What is claimed is:

1. A method for providing a multi-layer disc drive housing structure which encloses and supports an excitation source, the housing structure comprising a plurality of rigid damping layers interposed with a plurality of visco-elastic damping layers in a laminate stack, the method comprising steps of:

(a) determining a resonant frequency of a housing layer of a disc drive;

(b) developing a plurality of hypothetical models for the housing structure each comprising first, second and third theoretical layers wherein at least one of said theoretical layers comprises multiple damping layers;

(c) determining a loss factor profile for each said hypothetical model in relation to the resonant frequency; and

(d) selecting a final characteristic of each of said rigid damping layers and said visco-elastic damping layers in relation to the loss factor profiles from determining step (c).

2. The method of claim 1, the final characteristic selected during selecting step (d) comprises a respective thickness for each of the rigid damping layers.

3. The method of claim 2, wherein the final characteristic selected during selecting step (d) further comprises a respective thickness for the housing layer.

4. The method of claim 1, wherein the housing structure comprises five layers comprising the housing layer, a first visco-elastic damping layer affixed to the housing layer, a first rigid damping layer affixed to the first visco-elastic damping layer, a second visco-elastic damping layer

affixed to the first rigid damping layer, and a second rigid damping layer affixed to the second visco-elastic damping layer.

5. The method of claim 4, wherein at least one of said hypothetical models identifies the housing layer as the first theoretical layer, the first visco-elastic damping layer as the second theoretical layer, and the second visco-elastic damping layer and the first and second rigid damping layers as the third theoretical layer.

6. The method of claim 1, wherein each one of said theoretical layers comprising multiple layers is characterized as a composite layer, and wherein the selecting step (d) comprises steps of:

(d1) identifying an optimum hypothetical model from the plurality of hypothetical models;

(d2) developing a second plurality of hypothetical models for each composite layer of the optimum hypothetical model identified during identifying step (d1), each of said second plurality of hypothetical models in turn comprising first, second and third theoretical layers;

(d3) determining a loss factor profile for each of said second plurality of hypothetical models in relation to the resonant frequency; and

(d4) further selecting a final characteristic of each of said rigid damping layers and said visco-elastic damping layers in relation to the loss factor profiles from determining step (d3).

7. A disc drive having a multi-layer housing structure selected in accordance with the method of claim 1.

8. A multi-layer disc drive housing structure which encloses and supports an excitation source, comprising:

a substantially planar housing layer;

a first visco-elastic damping layer contactingly affixed to a portion of the housing layer;

a first rigid damping layer contactingly affixed to the first visco-elastic damping layer;

a second visco-elastic damping layer contactingly affixed to the first rigid damping layer; and

a second rigid damping layer contactingly affixed to the second visco-elastic damping layer, wherein the first and second visco-elastic damping layers and the first and second rigid damping layers share a common areal footprint over the housing member surface, and wherein the housing layer, the first and second visco-elastic damping layers and the first and second rigid damping layers have respective thicknesses selected to attenuate excitation energy transmitted to the planar housing member by the excitation source.

9. The multi-layer disc drive housing structure of claim 8, wherein the thickness of the first rigid damping layer is different than the thickness of the second rigid damping layer.

10. The multi-layer disc drive housing structure of claim 8, wherein the excitation source comprises a spindle motor configured to rotate a data storage disc within the disc drive housing structure, wherein the spindle motor is mechanically coupled to the planar housing member at a contact point, and wherein the multi-layer damping structure circumferentially extends about the contact point.

11. The multi-layer disc drive housing structure of claim 8, wherein the planar housing member comprises a planar recess substantially

corresponding to the areal footprint of the multi-layer damping structure, and wherein the multi-layer damping structure is disposed within the planar recess so that the first vibro-acoustic damping layer contactingly adheres to the planar recess.

12. The multi-layer disc drive housing structure of claim 8, wherein the first and second rigid damping layers are each formed of stainless steel.

13. The multi-layer disc drive housing structure of claim 8, wherein the first and second vibro-acoustic damping layers are each formed of pressure sensitive adhesive.

14. The multi-layer disc drive housing structure of claim 8, wherein the respective thicknesses of the first and second rigid damping layers are selected in accordance with a method comprising steps of:

(a) determining a resonant frequency of the housing layer;

(b) developing a plurality of hypothetical models for the housing structure each comprising first, second and third theoretical layers wherein at least one of said theoretical layers comprises multiple damping layers;

(c) determining a loss factor profile for each said hypothetical model in relation to the resonant frequency; and

(d) selecting the thickness of each of the first and second rigid damping layers in relation to the loss factor profiles from determining step (c).